

# Huntsville-Built 'Hermes' Becomes A Help For Soldiers

Kenneth Kesner, Associated Press Writer

HUNTSVILLE, Ala. (AP) — There are eyes and brains on the table at Advanced Optical Systems, next to a big metal hand with a powerful grip.

The rugged little cameras, black boxes of bristling circuit boards, LED beacons and the automatic cargo hook assembly housed in what looks like a desktop beer keg are part of the company's Hermes autonomous pickup and delivery system.

"A lot of the things that we do are image processing," said Joel Hannah, electrical and software engineering manager for AOS. "Our company motto has been 'We develop systems that see, understand and act.' "

Hermes — named for the messenger-delivery person to the gods in Greek mythology — is a good example. The system ties in to a helicopter's avionics, GPS navigation and other systems to automatically direct the aircraft over a load prepared for a pickup — let's say medical supplies, ammunition or parts needed to be moved by soldiers in the field.

The system's sensors make sure they're looking at the correct load, then maneuver the hovering helicopter through the process of lowering and precisely positioning the automatic cargo hook in a kind of docking procedure.

AOS has developed similar autonomous rendezvous and docking technology for NASA and for air-to-air refueling, said Dr. Richard Hartman, chairman and CEO. He is a former director of research for the Army Missile Command, a forerunner of today's Aviation and Missile Command, and he founded AOS in 1988 with two other men who have since left the company.

After picking up the slung load — the autonomous hook is rated for more than 1,000 pounds — Hermes directs the helicopter to the delivery point and does the same thing to lower and release the supplies, again using precision GPS, beacons and other technology. The system is scalable and can simply assist pilots picking up cargo or can be fully autonomous, working aboard unmanned rotorcraft to completely take Marines or soldiers out of harm's way in a supply operation.

A fully unmanned helicopter pickup and delivery using Hermes was demonstrated recently as part of the Army's Advanced Science and Technology Directorate's Family of Unmanned Systems Experiment. On July 23, the Army sent word that AOS would receive funding for the next round of Hermes development and testing, Hannah said.

Hermes is just one way AOS is developing optical and object-recognition

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technology, computers and software to process and analyze the images, then marrying it with a weapons or control system for some kind of action — see, understand, act, said Dr. Keith Farr, president.

Digital technology has made cameras and optical systems lighter and faster, he said. That, along with the tremendous growth in unmanned systems, is spurring demand for the sensors and other tools AOS creates.

In the industry, a lot of focus and research over the years went into how to get lots of really good images, said Dr. Stephen Granade, senior scientist.

"What we've also been focusing on is, once you have those images, how do you do something smart with those images?" he said. "How do you extract information out of there that's useful?"

For instance, using the data to track multiple, fast-moving targets as they crisscross paths on water or flash in and out of tree cover, then identify and classify those targets. Are they friends? Foes? Farmers? Terrorists?

An AOS system called DICE — Detect, Identify, Control, Engage — does that and will, in the next few years, be tested aboard Navy ships, Farr said, where it could be a major addition to anti-terrorism force-protection measures.

AOS is also developing tools to help pilots who must operate in low-visibility conditions, such as "brownouts."

"In the brownout scenario you have static objects and then you have a lot of dust, or snow or sand being blown around," said Dr. Stephen Fox, AOS's optical and mechanical engineering manager.

The company's 20 employees include five Ph.D.s among other degrees, and the staff publishes papers and holds more than 15 patents.

But AOS focuses on applying research to the real world, Hartman said, creating systems that have to work in rain and mud and space, aboard ships, trucks and aircraft, and must work the first time, all the time.

"Hardware is more important than papers to us," Hartman said.

The veteran-owned small business, which has worked on projects for the Army, Navy, Air Force, NASA, Missile Defense Agency, Boeing, Lockheed Martin, Northrop Grumman, Raytheon, Orbital Sciences Corp. and other customers over the years, is now putting some of its own hardware and software on the commercial market, he said.

Among the first products are a Video Acquisition and Processing Card and Signal Processing Card.

"We've always built hardware," Farr said. "But it's usually ended at a prototype that

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somebody else takes forward ... In several cases, for example the space-NASA things we have done, a one-off is all that was required."

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